CLAIMS

We claim:

1. A fuel system comprising:

a fuel storage tank;

a downstream use for fuel;

a fluid connection for communicating fuel from said fuel storage tank to said downstream use; and

a fuel deoxygenator mounted in said fluid connection, said fuel deoxygenator having a non-porous membrane, said non-porous membrane comprising a first membrane layer and at least a second membrane layer disposed on top of said first membrane layer.

2. The fuel system as recited in claim 1, wherein said non-porous membrane is disposed on a substrate.

3. The fuel system as recited in claim 1, wherein at least one of said first membrane layer and said second membrane layer is a fluoropolymer.

4. The fuel system as recited in claim 3, wherein at least one of said first membrane layer and said second membrane layer is an amorphous glassy perfluorodioxole copolymer.

5. The fuel system as recited in claim 1, wherein said non-porous membrane is a homogenous non-porous membrane.

6. A method of preventing a liquid from migrating into a non-porous membrane comprising the steps of:

forming a first membrane layer in a first coating process by drying a first solution in a first drying process;

forming a second membrane layer on top of the first membrane layer in a second coating process by drying a second solution in a second drying process, the second membrane layer and the first membrane layer form a non-porous membrane; and

disposing said non-porous membrane in a fluid separating device.

7. The method as recited in claim 6, including the step of disposing the non-porous membrane on a substrate.

8. The method as recited in claim 6, including the step of forming a partially dissolved portion of the first membrane layer by partially dissolving the first membrane layer with the second solution so that the second membrane layer forms a single homogenous non-porous membrane with the first membrane layer after the second drying process.

9. The method as recited in claim 6, wherein the first solution comprises an amorphous glassy perfluorodioxole copolymer dissolved in a fluorosolvent that has a boiling point between 60°C and 110°C.

10. The method as recited in claim 6, wherein the second solution comprises an amorphous glassy perfluorodioxole copolymer dissolved in a fluorosolvent that has a boiling point between about 60°C and about 110°C.

11. The method as recited in claim 6, wherein said first drying process includes the step of heating to between about 130°C and about 150°C for between 10 minutes and about 30 minutes.

12. The method as recited in claim 6, wherein said second drying process includes the step of heating to between about 130°C and about 150°C for between 10 minutes and about 30 minutes.

13. The method as recited in claim 6, wherein said first coating process includes rolling said first solution onto said substrate.

14. The method as recited in claim 6, wherein said second coating process includes rolling said second solution on top of said first membrane layer after said first drying process.

15. The method as recited in claim 6, wherein said fluid separating device is a fuel deoxygenator of an aircraft.

16. A fluid separator having a first membrane layer and at least a second membrane layer disposed on top of said first membrane layer.

17. The fluid separator as recited in claim 16, wherein said fluid separator is disposed on a substrate.

18. The fluid separator as recited in claim 16, wherein at least one of said first membrane layer and said at least a second membrane layer is formed from a fluoropolymer.

19. The fluid separator as recited in claim 18, wherein at least one of said first membrane layer and said at least a second membrane layer is formed from an amorphous glassy perfluorodioxole copolymer.

20. The fluid separator as recited in claim 16, wherein said fluid separator is a homogenous non-porous membrane.